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Enterprise collaboration systems: an analysis and classification of adoption challenges.

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Abstract

In this paper we present the findings of the first part of a research project examining the adoption, appropriation and long-term use of enterprise collaboration systems (ECS). The aim of the study is to identify the challenges that organizations encounter during the introduction and use of an ECS. Through a meta-analysis and classification of the academic literature and corroborating company interviews five adoption challenge areas were identified: *culture*, *business/ operation*, *technology in use*, *benefits*, and *attitude/ behavior*. The challenges and the associated sub-challenges are described and their nature and implications for both theory and practice are discussed.

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Keywords: Enterprise social software (ESS); Enterprise collaboration systems (ECS); adoption challenges.

1. Introduction

In this paper we examine the challenges that organizations encounter during the introduction of an enterprise collaboration system (ECS). ECS combine Enterprise Social Software (ESS) components (e.g. social profiles, tags, wikis, blogs) with traditional groupware components (e.g. e-mail, group calendars, document libraries)[1,2] to support social business and communication, collaboration, content and knowledge sharing within organizations. These

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"socially-enabled" collaboration systems are generating considerable interest for both researchers and practitioners, however there are still uncertainties about their successful adoption and appropriation[3,4,5]. One of the problems is that the body of research that, directly or indirectly, examines the adoption of ECS is currently fragmented, with few in-depth empirical cases. The study presented in this paper is part of a wider, multidisciplinary research program examining collaboration systems and the emerging digital workplace[6,7]. The stream of work reported in this paper is directed towards investigating sociotechnical change and the adoption, appropriation and use of ECS. The study examines the challenges that companies are facing during the adoption of ECS and the strategies and approaches they take to addressing these challenges. In this paper we present the findings of the first stage of the work: the identification and classification of ECS adoption challenges. Through an in-depth analysis and synthesis of the extant literature and triangulating company interviews, our research objectives are to: i) identify the challenges that organizations experience during the process of ECS introduction and ii) to classify the identified challenges and understand their implications for ECS adoption. The outcome is an analysis and classification of ECS adoption challenges. The paper is organized as follows. In the next section we provide a brief overview of the research design and analysis methods. This is followed by the presentation of the derived classification, and the discussion of the findings and their implications for future work.

2. Research design

The study adopts an iterative, interpretive and qualitative research approach and uses a qualitative meta-analysis method to *discover key challenges that companies face when introducing their enterprise collaboration systems.* Two main data sources are used: i) the academic literature on ESS/ECS and ii) company interviews to triangulate the findings derived from the literature. The study is organized into three phases as shown in Figure 1.

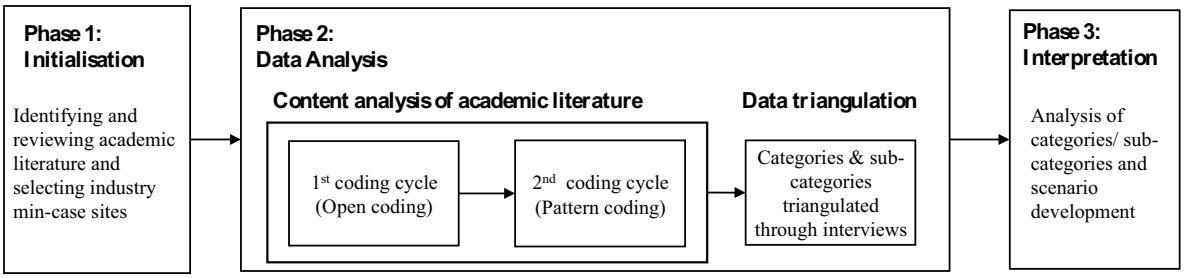

Figure 1: Research steps

Phase 1: Initialisation comprises an extensive search and analysis of the academic literature on enterprise collaboration systems. Following the approach of Huff[8], we begin with a broad search of the topic of ECS with the view that adoption challenges may be encountered in all types of study not just those focusing specifically on ECS adoption. Databases including SpringerLink, IEEE Xplore Digital Library, ACM Digital Library, Emerald Insight, ScienceDirect, and Google Scholar were searched using combinations of search terms such as "social software", "e-collaboration", "web 2.0", "enterprise 2.0", "social business", "collaborative software", "enterprise social software", "enterprise collaboration system" "adoption" etc. to provide a corpus of primary articles. A snowball technique to literature searching was then applied to identify additional relevant articles from the reference lists of the primary articles. In parallel with the literature search company mini case sites were selected and interviews arranged for the collection of triangulating data. It was a prerequisite that the selected companies had introduced an ECS and were willing to speak openly about their experiences and the adoption challenges they had experienced.

Phase 2: Data Analysis is a qualitative in-depth literature analysis to identify and categorize ECS adoption challenges. This phase was organized in three steps: two cycles of literature analysis and coding to classify the ECS adoption challenges followed by interviews in the two case study companies to refine the classification and capture any additional challenges.

In *Phase 3: Interpretation and Explanation* the identified challenges are then described in detail and exemplary scenarios developed to examine each challenge and the wider theoretical and practical implications are considered.

3. Data analysis and findings

The aim of the first coding cycle is to generate a preliminary code table containing the adoption challenges identified from the literature analysis. Each article was read, analyzed and coded using an open coding approach[9]. Following several coding iterations, the outcomes of the first coding cycle resulted in a code catalogue with 29 distinctive codes. Based on these open codes a second coding cycle using pattern coding[9,10] established meaningful categories and sub-categories of the identified challenges. To achieve this, similar codes are assembled together and thematic codes developed. Where necessary, codes of the first coding cycle were refined. Five adoption challenge areas were identified: *culture*, *business/ operation*, *technology in use*, *benefits*, and *attitude/ behavior* each of which comprises a group of challenge types and sub-types as shown in in Figure 2.

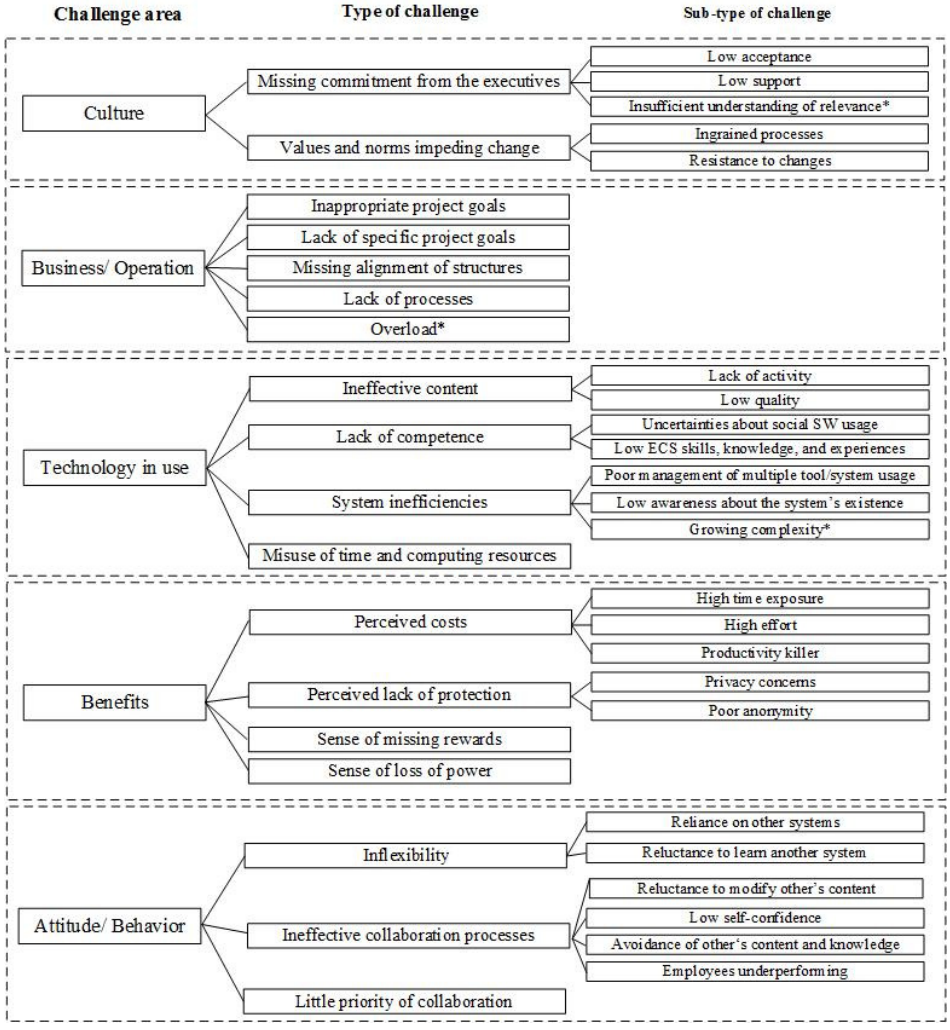

Figure 2: Classification of ECS adoption challenges

To confirm the codes identified from the literature analysis and to identify additional codes, semi-structured face-to-face interviews were conducted with practitioners, including the CEO and a key user, in two technology startup companies. The codes from the literature analysis were cross-referenced with data from the company interviews. Three additional challenges were identified from the interview transcripts that were not found in previous studies, these are: *Insufficient understanding of relevance*, *Overload*, *Growing complexity*. In Figure 2 the three new challenge codes identified from the interviews are marked with an asterisk (*). In the following sections we discuss and provide examples for each of the five challenge areas and their sub-types. Note: due to page limit constraints we cannot include references for all the literature analyzed and provide only key example references in Tables 1-5.

3.1. Challenge area: Culture

The first challenge area identified is *Culture*. Table 1 contains the descriptions of the challenge types and sub-types identified and assigned to this challenge area. Culture challenges are organizational challenges that can be traced back to the corporate culture being shaped by management behavior and attitudes as well as the cultural values and norms that exist within the company.

Table 1. Types and sub-types of the challenge area *Culture*

Culture	
Type of challenge and description	Sub-type of challenge and description
Missing commitment from the executives: Managers do not support the system's adoption and usage by either not engaging with employees or by mistrusting them.	*Low acceptance*: Managerial assumption that employees misuse the ECS. As a consequence, adoption and usage may be hindered by the lack of management support.[11,12,13,14]
	Low support: The management does not properly promote and encourage the employees to use the ECS.[13,15]
	*Insufficient understanding of relevance**: Although the ECS has been introduced to meet certain demands, the management ascribes only little relevance to its use.
Values and norms impeding change: The company (unwittingly) sticks to old work practices and is unwilling to change and adapt them.	*Ingrained processes:* If a system had not appeared as part of the enterprise's daily workflow before, it may be difficult for the company to remember changes.[16,17]
	Resistance to changes: Low willingness to embrace the system in discussion due to fear of cultural change.[18,19,15,14]

Two different Cultural challenge types were identified. *Missing commitment from the executives* is where managers do not engage with employees or mistrusts them, and thus do not support their adoption and usage of the ECS. Instances of this type of challenge are: *Low acceptance*, *Low support*, and *Insufficient understanding of relevance*. The second challenge we identified is *Values and norms impeding change,* which addresses difficulties in overcoming ingrained work processes and the resistance to cultural change, which may be initiated by the ECS being introduced. This type of challenge has two associated sub-types, *Ingrained processes* and *Resistance to changes*.

3.2. Challenge area: Business/ Operation

The second area of challenges identified is *Business/ Operation.* Challenges in this area can be attributed to both ineffective and inefficient uses due to operating without clear and suitable specifications/objectives regarding the ECS project, as well as missing or poor general work management. This challenge area includes five different challenge types: *Inappropriate project goals*, *Lack of specific project goals*, *Missing alignment of structures*, *Lack of processes*, and *Overload*. Table 2 shows the descriptions of the challenge types and sub-types identified and assigned to this challenge area.

Table 2. Types of the challenge area *Business/ Operation*

Business/ Operation
Type of challenge and description
Inappropriate project goals: Misalignment of project goals and enterprise goals.[13]
Lack of specific project goals: A lack of specific project goals may lead to the assumption that ECS use does not lead towards fulfilling goals, and thus possibly to low motivation.[18,16]
Missing alignment of structures: Organisational hierarchy/ structure and the social software approach form a poor match.[20,21,12,17,15]
Lack of processes: A lack of processes which map daily work practices to the system's capabilities may mean that ECS use are seen as additional burden.[22,18,12,14]
*Overload**: Employees may be overwhelmed with work forcing them to set priorities. They may like using the ECS but they are otherwise engaged so that they forget about it or have little time to learn how to use it.

3.3. Challenge area: Technology in use

Challenges of the area *Technology in use* deal with the handling and management of work and working with the ECS technology itself. This includes personal adoption hurdles due to, for instance, missing awareness and knowledge about the newly introduced ECS, poor quantity, quality and organization of the ECS content and information management processes, as well as poor integration of the ECS into the IT and work environment. Table 3 shows the descriptions of all codes assigned to this challenge area.

Table 3. Types and sub-types of the challenge area *Technology in use*

Technology in use	
Type of challenge and description	Sub-type of challenge and description
Ineffective content: Lack of an adequate amount of content and/or no frequently updated content as well as content of low relevance impeding ECS usage.	*Lack of activity*: The ECS and its components lack active engagement. As a result, the created content may not be accepted or, even worse, the system may not be kept alive.[23,24,12,25]
	Low quality: Content edited in a willful destructive manner to include irrelevant information (vandalism) or content that is subject to immense, uncontrolled growth. As a result the content may not be reused, add value or employees may encounter problems in terms of navigation, orientation and search.[24,21,26]
Low competence: Missing skills to use the ECS.	*Uncertainties about social software usage:* Employees who already use similar social software tools during leisure time may be unsure about how to use them in a corporate context.[11,12]
	Low ECS skills, knowledge, and experiences: Mental overload of the usage of the ECS due to missing IT skills, knowledge, and experiences.[12,16,17,26]
System inefficiencies: Low awareness about the system's existence and difficulties to cope with a number of different tools and systems as well as the growing amount of content.	*Poor management of multiple tool/system usage*: If a company makes use of a set of different social software tools and/or systems employees will possibly be uncertain about when to use which tool or system for which purposes.[27]
	Low awareness about the system's existence: Employees do not know about the existence of the ECS. This may be due to missing communication and marketing activities.[28,15]
	Growing complexity:* With the growing number of users and data stored in the ECS the system's complexity increases which brings increasingly difficult coordination and decreasing

	clearness about incorporated content and processes.
Misuse of time and computing resources: Employees spending too much time using the ECS and thus misusing computing resources.[14]	

Four different challenge types were assigned to this challenge area. The first deals with poor content quantity and quality, which may lead to low acceptance of the ECS and/or questionable usefulness of the ECS and its content (*Ineffective content*). Due to different direct consequences, this challenge type is split up into two sub-types: *Lack of activity* and *Low quality*.

The second type of this challenge area describes missing competence in using the ECS (*Low competence*). This missing competence can have different manifestations in the two sub-challenges identified: *Uncertainties about social software usage* and *Low ECS skills, knowledge, and experience.*

The third type of challenge addresses problems that can be traced back to the increasing complexity of the ECS and the poor communication of, and adherence to, a defined position on the role of the ECS within the established corporate IT environment (*System inefficiencies*). Sub-challenges assigned to this challenge type are *Poor management of multiple tool/system usage*, *Low awareness about the system's existence*, and *Growing complexity*.

The fourth and last challenge type of this area is *Misuse of time and computing resources*.

3.4. Challenge area: Benefits

Challenges of this area address the questionable benefits of using an ECS, with perceived disadvantages outweighing the perceived advantages of it. Table 4 shows the codes and descriptions assigned to the Benefits challenge area. Four different challenge types were identified for this challenge area. The first deals with the perception of the disproportionally high workload required for using the ECS (*Perceived costs*). This challenge type is split up into the three sub-challenges *High time exposure*, *High effort*, and *Productivity killer*.

The second type encompasses the challenges *Privacy concerns* and *Poor anonymity*. These challenges have in common that employees are lacking mechanisms to protect their personal information and/or against personal harm (*Perceived lack of protection*). The types *Sense of missing rewards* and *Sense of loss of power* are two further challenge types of this area.

Table 4. Types and sub-types of the challenge area *Benefits*

Benefits	
Type of challenge and description	Sub-type of challenge and description
Perceived costs: Not recognizing the business value but focusing on the workload.	*High time exposure:* The individual perception that using the ECS is too time-consuming.[17,26,15,14]
	High effort: The individual perception that using the ECS requires a lot personal initiative.[16,29,26]
	Productivity killer: The individual perception that the usage of the ECS decreases the overall productivity.[30,26]
Perceived lack of protection: Perception that using the ECS lacks protection of the personal privacy and sensitive information.	*Privacy concerns:* Employees may be reluctant to contribute and share content within the ECS due to sensitivities to the openness of the sharing environment. They may be unwilling to publish content in a context possibly being viewed by a wider audience of the company.[24,16]
	Poor anonymity: Anonymous content creation and editing may be prohibited within the ECS. The lack of anonymity may result in concerns regarding the harm of oneself/the company or jurisdiction.[31,26]
Sense of missing rewards: As content can usually been	

written or edited by anybody, employees may sense a missing recognition of their authorship.[21]	
Sense of loss of power: Sharing one's own knowledge within the ECS may be evaluated as a latent loss of influence.[21,12]	

3.5. Challenge area: Attitude/ Behavior

In contrast to the challenge area *Culture*, the challenge area *Attitude/ Behavior* addresses individual and not organizational level challenges. Employees may show inflexibility regarding the use of a new system, may not properly collaborate within the system for various individual characteristics and attitudes, or give only little priority to ECS use. Table 5 shows the descriptions of all codes assigned to this challenge area. Three different challenge types of challenges were assigned to this challenge area. The first challenge type of this area is avoidance of ECS use as alternative systems or work procedures not including the ECS are preferred (*Inflexibility*). The challenges that can be classed with this type are *Reliance on other systems* and *Reluctance to learn another system*.

Table 5. Types and sub-types of the challenge area *Attitude/ Behavior*

Attitude/ Behavior	
Type of challenge and description	Sub-type of challenge and description
Inflexibility: The unwillingness to learn ECS use and the reliance on other systems due to routine work practices, laziness or the perceived lack of benefits of the ECS.	*Reliance on other systems*: Even if a new system, i.e. the ECS, may fill a gap employees may rely on other systems, possibly even on non-social business software, due to routine work practices or privacy concerns, for instance.[16]
	Reluctance to learn another system: Employees do not want to learn another system, i.e. the ECS. This may be justified by a lack of time or the desire to do so.[16,17]
Ineffective collaboration processes: The collaboration process within the ECS is complicated by individual barriers to appropriate and use other's content and to contribute.	*Reluctance to modify other's content*: Unwillingness to edit/add something to someone else's content.[32,16]
	Low self-confidence: Employees may lack self-confidence resulting in either not contributing or the hesitation to actively ask others for contributions.[12]
	Avoidance of other's content and knowledge: Other employees' content is avoided. It is rather recreated instead of reused. This behavior may be explained by the fear of the unknown or the overestimation of personal capabilities (Not-Invented-Here syndrome).[12,13]
	Employees underperforming: Employees may be tempted to underperform in collaborative situations due to hardly measurable output of the individual contribution (free-rider effect).[12]
Little priority of collaboration: Employees' perception that using the system is not part of their paid work.[16,17]	

Another type of challenge of this challenge area focuses on personal hurdles in effectively appropriating and actively using the ECS (*Ineffective collaboration processes*). These hurdles may be provoked by the rejection of one's own or another's contribution as well as by the open nature of the collaboration technology. The challenges *Reluctance to modify other's content*, *Low self-confidence*, *Avoidance of other's content and knowledge*, and *Employees underperforming* were assigned to this challenge type. The last challenge type of this challenge area is *Little priority of collaboration* where employees do not see using the ECS as part of their normal work.

The occurrence of the identified challenges is likely to be highly context-dependent. However, both case study companies rated the challenges “Lack of specific project goals”, “Lack of activity”, “Low quality”, “Low support” and “High effort” as highly serious.

4. Conclusions and future work

The adoption and appropriation of enterprise collaboration systems is presenting organizations with a range of challenges. In this study, based on a review of the extant literature and confirming interviews we classified these challenges into five areas: Culture, Business/ Operations, Technology in Use, Benefits and Attitude/ Behavior. Whilst many of the challenges, such as low management commitment and users’ resistance to change may arise with the introduction of any new business information system there are other challenges that are specifically problematic with ECS. For example, ineffective content in the ECS is a major problem through *lack of activity*, which results in not enough useable content, or where content exists it is of *low quality* making the system ineffective and undesirable to employees. Poor processes and structures impeding adoption is especially noticeable with ECS; employees usually have many alternatives to the new system (e.g. email, previous generations of groupware etc.) requiring clearly demonstrable benefits from their adoption of the new system. Diehl et al. (2013)[18] found that companies in their study of ECS adoption had only realised ex post that they had been situated in a cultural change scenario with their ECS implementation. With transactional systems such as ERP systems, adoption is almost always mandatory, whereas use of an ECS is very often voluntary. If clear objectives, structures and training are not available then users have the option to not use the ECS, making the change management process even more essential.

As stated at the outset, this study is part of a wider research program examining ECS and sociotechnical change. Through the development of the adoption challenges classification we also identified that such challenges appear at different stages in the adoption process and to different stakeholder groups. This spatiotemporal aspect of ECS adoption is the subject of our second study, combined with an examination of the strategies that companies use to address ECS adoption challenges. A limitation of the existing literature on ECS adoption is that the majority of studies are cross-sectional, conducted at a single point in time. To gain richer insights into the adoption and appropriation of ECS requires in-depth, longitudinal case studies that follow the entire adoption process from the decision to adopt through to the post-implementation change phase.

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